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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
KIM, TAE JUN	

ART UNIT	PAPER NUMBER
3746	

DATE MAILED: 04/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/014,415	MOWILL, R. JAN	
	Examin r	Art Unit	
	Ted Kim	3746	

-- Th MAILING DATE of this communication app ars on th cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,11-22 and 24-33* is/are pending in the application.

4a) Of the above claim(s) *2,7,8 and 15-19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,9,11-14,20-22,24,25 and 27-33* is/are rejected.

7)☒ Claim(s) *26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/18/04 4/06/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 20, 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Owens et al (4,078,377) in view of the admitted prior art. Owens et al teach a gas turbine engine premixer (fig. 15)180 having a mixing tube having an entrance configured for receiving atomized fuel 188 and compressed air which flows past 248 and 250 and into the premixing chamber 180 (or can flow in with the atomizer, see e.g. Fig. 3a), and a mixture valve 196, 178 associated with a mixing tube exit for varying a fuel/air mixture discharge velocity into the combustor, the mixture valve having an inner axially movable valve member 198 to vary the exit flow area with outer member 178, a valve stem is attached to the valve plate. Also taught is cooling air from 210, 212, 214 for cooling the valve stem and valve plate (see col. 10, lines 1 and following). A valve actuator 208 is attached to the stem. Air is channeled in at least two opposed directions radially outward from the mixing tube axis. Owens et al do not teach the air valve and fuel valve to control the fuel/air ratio entering the premixer. The use of the air valve and fuel valve to control the fuel/air ratio entering the premixer is admitted prior art (see e.g. Fig. 1A, 90,

92; Fig. 5, 592, 590 and many other embodiments, where the air is controlled in response to flow of fuel). It would have been obvious to one of ordinary skill in the art to control the fuel/air ratio entering the premixer as being the conventional practice in the art.

3. Claims 20, 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leonard et al (5,319,923). Leonard teaches teach a gas turbine engine premixer 16 having a mixing tube having an entrance configured for receiving fuel 14 and compressed air 6, and a mixture valve 38 associated with a mixing tube exit for varying a fuel/air mixture discharge velocity into the combustor, the mixture valve having an inner axially movable valve plate member 34, 38 (see arrow X, col. 3, lines 22+) and outer valve member 24 to vary the exit flow area, a valve stem 34 is attached to the valve plate, cooling air (as part of a fuel/air mixture) is injected into pores 40 in the valve stem via passage 36. A valve actuator is attached to the stem 34. Air is channeled in at least two opposed directions radially outward from the mixing tube axis. Leonard et al do not teach the air valve and fuel valve to control the fuel/air ratio entering the premixer. The use of the air valve and fuel valve to control the fuel/air ratio entering the premixer is admitted prior art (see e.g. Fig. 1A, 90, 92; Fig. 5, 592, 590 and many other embodiments, where the air is controlled in response to flow of fuel). It would have been obvious to one of ordinary skill in the art to control the fuel/air ratio entering the premixer as being the conventional practice in the art.

4. Claims 20, 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powter et al (5,319,923). Powter et al teach a gas turbine engine premixer having a

mixing tube having an entrance configured for receiving fuel 14 and compressed air 13, and a mixture valve 19 associated with a mixing tube exit for varying a fuel/air mixture discharge velocity into the combustor, the mixture valve having an inner axially movable valve plate member 19 relative to the outer valve member, which is the inner portion of 4, to vary the exit flow area 15, a valve stem 20 is attached to the valve plate. A valve actuator 21-23 is attached to the stem 20. Air is channeled in at least two opposed directions radially outward from the mixing tube axis. Powter et al do not teach the air valve and fuel valve to control the fuel/air ratio entering the premixer. The use of the air valve and fuel valve to control the fuel/air ratio entering the premixer is admitted prior art (see e.g. Fig. 1A, 90, 92; Fig. 5, 592, 590 and many other embodiments, where the air is controlled in response to flow of fuel). It would have been obvious to one of ordinary skill in the art to control the fuel/air ratio entering the premixer as being the conventional practice in the art.

5. Claims 20, 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu et al (5,343,693). Komatsu et al (see Figure 11) teach a gas turbine engine premixer having a mixing tube having an entrance configured for receiving fuel 6 and compressed air G_A, and a mixture valve (formed between 1 and 7b) associated with a mixing tube exit for varying a fuel/air mixture discharge velocity into the combustor, the mixture valve having an axially movable valve plate member 9d, 11 and a stationary mixing tube exit member 1 to vary the exit flow area, a valve stem 21b is attached to the valve plate. A valve actuator is attached to the stem 21b. A fuel valve 31, 32 (same as in

Fig. 1), and an air valve (between plate 19 and cylindrical member 9d control the air flow into the premixing chamber. A controller 23 (same as in Fig. 1) is also taught. Air is channeled in at least two opposed directions radially outward from the mixing tube axis. Komatsu et al do not teach the air valve and fuel valve to control the fuel/air ratio entering the premixer. The use of the air valve and fuel valve to control the fuel/air ratio entering the premixer is admitted prior art (see e.g. Fig. 1A, 90, 92; Fig. 5, 592, 590 and many other embodiments, where the air is controlled in response to flow of fuel). It would have been obvious to one of ordinary skill in the art to control the fuel/air ratio entering the premixer as being the conventional practice in the art.

6. Claims 20, 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powter et al (5,319,923). Powter et al teach a gas turbine engine premixer having a mixing tube having an entrance configured for receiving fuel 14 and compressed air 13, and a mixture valve 19 associated with a mixing tube exit for varying a fuel/air mixture discharge velocity into the combustor, the mixture valve having an inner axially movable valve plate member 19 relative to the outer valve member, which is the inner portion of 4, to vary the exit flow area 15, a valve stem 20 is attached to the valve plate. A valve actuator 21-23 is attached to the stem 20. Air is channeled in at least two opposed directions radially outward from the mixing tube axis. Powter et al do not teach the air valve and fuel valve to control the fuel/air ratio entering the premixer. The use of the air valve and fuel valve to control the fuel/air ratio entering the premixer is admitted prior art (see e.g. Fig. 1A, 90, 92; Fig. 5, 592, 590 and many other embodiments, where the air is

controlled in response to flow of fuel). It would have been obvious to one of ordinary skill in the art to control the fuel/air ratio entering the premixer as being the conventional practice in the art.

7. Claims 11, 20, 28-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Rubins et al (4,150,539). Rubins et al teach a gas turbine engine premixer having a mixing tube having an entrance configured for receiving fuel 34 and compressed air from 33, a venturi near 34 for mixing the received fuel and air to form a fuel/air mixture and an exit, and a mixture valve having outer portion 26 and inner portion 38 associated with a mixing tube exit for varying a fuel/air mixture discharge velocity into the combustor, the mixture valve having an inner axially movable valve member 38 relative to the outer valve member 38 to vary the exit flow area, a valve stem 40 is attached to the valve. A valve actuator 42 is attached to the stem 40. The exit area includes area portions configured for channeling air in at least two opposed directions radially outward from the mixing tube axis. Rubins et al teach using either a cylindrical (can) or annular combustor (col. 2, lines 12+). Rubins et al do not teach the air valve and fuel valve to control the fuel/air ratio entering the premixer. The use of the air valve and fuel valve to control the fuel/air ratio entering the premixer is admitted prior art (see e.g. Fig. 1A, 90, 92; Fig. 5, 592, 590 and many other embodiments, where the air is controlled in response to flow of fuel). It would have been obvious to one of ordinary skill in the art to control the fuel/air ratio entering the premixer as being the conventional practice in the art.

8. Claims 20, 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holzapfel (4,350,009). Holzapfel et al teach a gas turbine engine premixer having a mixing tube having an entrance configured for receiving fuel 26, 9 and compressed air from 11, a venturi near 11a for mixing the received fuel and air to form a fuel/air mixture and an exit, and a mixture valve having outer portion 11a and inner portion 4 associated with a mixing tube exit for varying a fuel/air mixture discharge velocity into the combustor, the mixture valve having an inner axially movable valve member 4 relative to the outer valve member 11a to vary the exit flow area, a valve stem 31 is attached to the valve. A valve actuator is attached to the stem. The exit area includes area portions configured for channeling air in at least two opposed directions radially outward from the mixing tube axis. Holzapfel et al do not teach the air valve and fuel valve to control the fuel/air ratio entering the premixer. The use of the air valve and fuel valve to control the fuel/air ratio entering the premixer is admitted prior art (see e.g. Fig. 1A, 90, 92; Fig. 5, 592, 590 and many other embodiments, where the air is controlled in response to flow of fuel). It would have been obvious to one of ordinary skill in the art to control the fuel/air ratio entering the premixer as being the conventional practice in the art.

9. Claims 1, 3-6, 9, 13, 20, 24-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of the above prior art[1], as applied above, and further in view of any of Willis et al (5,121,608), Blaha (2,904,108) and Blaha (2,669,300). The above prior art

[1] Rubins et al is applied to the annular combustors -- all the other art are applicable where the annular combustor is not claimed.

teach various aspects of the claimed invention but do not teach the use of segmenting the exit area of the premixer. Each of the prior art do teach at the exit area a conical or plate shaped member to tangentially deflect the fuel/air mixture. Willis et al teach a premixer where at the exit area of a conical or plate shaped member 29 is segmented by 31, 32 to tangentially deflect the fuel/air mixture and to ensure the airflow remains non-turbulent (col. 3, lines 4+). Blaha '108 teaches a premixed fuel/air mixture in 11 where at the exit area of a conical or plate shaped member 29 is segmented 33 to tangentially deflect the fuel/air mixture and to enhance dispersion. Blaha '300 teaches a premixed fuel/air mixture in 29 where at the exit area of a conical or plate shaped member 37 is segmented via 41 or 57 to tangentially deflect the fuel/air mixture to enhance dispersion. It would have been obvious to one of ordinary skill in the art to employ a segmented exit area, as taught by any of Willis et al (5,121,608), Blaha (2,904,108) and Blaha (2,669,300), in order to prevent turbulence or enhance tangential dispersion into the combustion chamber. As for the radial turbine, and two or more premixers and/or a single premixer at only one angular position, these are either admitted prior art (with respect to Figs. 1-15) or found in Mowill (5,765,363). It would have been obvious to one of ordinary skill in the art to employ the claimed premixers, turbines, etc, as features old and well known in the gas turbine art.

10. Claims 1, 3-6, 9, 13, 20, 24, 25, 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holzapfel (4,350,009) or Owens (4,078,377) in view of Rubins et al (4,150,539) and further in view of any of Willis et al (5,121,608), Blaha (2,904,108)

and Blaha (2,669,300). Holzapfel teach a premixer but do not teach the combustor is annular. Owen teaches a premixer but does not teach the premixer is annular. Owens does teach a venturi (Fig. 8) is used in his invention. It would have been obvious to one of ordinary skill in the art to use a venturi to enhance the mixing with the air. Rubins et al teach using either a cylindrical (can) or annular combustor (col. 2, lines 12+) is well known for use with exit valves of premixers. It would have been obvious to one of ordinary skill in the art to employ the premixers of either Holzapfel or Owens, in an annular combustor configuration, as a well known combustor configuration used with such premixer exit valves. The above prior art teach various aspects of the claimed invention but do not teach the use of segmenting the exit area of the premixer. Each of the prior art do teach at the exit area a conical or plate shaped member to tangentially deflect the fuel/air mixture. Willis et al teach a premixer where at the exit area of a conical or plate shaped member 29 is segmented by 31, 32 to tangentially deflect the fuel/air mixture and to ensure the airflow remains non-turbulent (col. 3, lines 4+). Blaha '108 teaches a premixed fuel/air mixture in 11 where at the exit area of a conical or plate shaped member 29 is segmented 33 to tangentially deflect the fuel/air mixture and to enhance dispersion. Blaha '300 teaches a premixed fuel/air mixture in 29 where at the exit area of a conical or plate shaped member 37 is segmented via 41 or 57 to tangentially deflect the fuel/air mixture to enhance dispersion. It would have been obvious to one of ordinary skill in the art to employ a segmented exit area, as taught by any of Willis et al (5,121,608), Blaha (2,904,108) and Blaha (2,669,300), in order to prevent turbulence or

enhance tangential dispersion into the combustion chamber. As for the radial turbine, and two or more premixers and/or a single premixer at an one angular position, these are either admitted prior art (with respect to Figs. 1-15) or found in Mowill (5,765,363). It would have been obvious to one of ordinary skill in the art to employ the claimed premixers, turbines, etc, as features old and well known in the gas turbine art.

11. Claims 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of the above prior art in view of Ohyama et al (5,533,329). The above applied prior art teach applicant's claimed invention but do not teach the specific use of a pressure sensor connected to a controller to control the actuator for the mixture valve. Ohyama et al teach that it is old and well known in the art to employ a pressure sensor (rather than a temperature sensor) 50 (see col. 5, lines 11+) in the premixer to allow the controller 60 to control the fuel and air entering the premixer by controlling valves (see e.g. abstract) for the fuel and air. It would have been obvious to one of ordinary skill in the art to sense the pressure in the premixer to control the position of the mixture valve member, as a well known parameter for controlling the premixer flow. It would have been obvious to one of ordinary skill in the art to use one of two preselected positions, as being within the ordinary skill in the art, as multiple positions are clearly taught.

12. Claims 11, 12, 14, 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of Rubins et al (4,150,539) or either Holzapfel (4,350,009) or Owens (4,078,377) in view of Rubins et al (4,150,539), as applied above, and further in view of Ohyama et al (5,533,329) and optionally Komatsu et al (5,353,693). The above

applied prior art teach applicant's claimed invention but do not teach the air valve and fuel valve to control the fuel/air ratio entering the premixer. Note that Holzapfel additionally teaches a controller for the mixture valve (col. 1, lines 65-col. 2, lines 25; col. 3, lines 9-24). The use of the air valve and fuel valve to control the fuel/air ratio entering the premixer is admitted prior art (see e.g. Fig. 1A, 90, 92; Fig. 5, 592, 590 and many other embodiments, where the air is controlled in response to flow of fuel). It would have been obvious to one of ordinary skill in the art to control the fuel/air ratio entering the premixer as being the conventional practice in the art. Alternately, Ohyama et al teach that it is old and well known in the art to employ a pressure sensor (rather than a temperature sensor) 50 (see col. 5, lines 11+) in the premixer to allow the controller 60 to control the fuel and air entering the premixer by controlling valves (see e.g. abstract) for the fuel and air. It would have been obvious to one of ordinary skill in the art to sense the pressure in the premixer to control the position of the mixture valve member, as a well known parameter for controlling the premixer flow. It would have been obvious to one of ordinary skill in the art to use one of two preselected positions, as being within the ordinary skill in the art, as multiple positions are clearly taught. Ohyama et al teach that it is old and well known in the art to employ a pressure sensor (rather than a temperature sensor) 50 (see col. 5, lines 11+) and fuel flow sensors 25-29 in the premixer to allow the controller 60 to control the fuel and air valves entering the premixer by controlling valves (see e.g. abstract) for the fuel and air. Sensor 50 is positioned in the premixer 7 (col. 6, lines 25+). These valves not only include the inlet air and fuel inlet valves but also can

be considered to be a generic teaching for the need to control the amount of fuel and air entering the combustor, which in the case of the applied prior art is also controlled by the mixture valve. It would have been obvious to one of ordinary skill in the art to employ not only fuel and air valves to control the fuel and air flows entering the premixers of the prior art, but to also utilize the controller to control the position of the mixture valve member, as the position of the mixture valve member of the prior art is also responsible for controlling how much fuel and air enter the combustor by controlling the exit area. Komatsu teach varying the exit valve position based on load and fuel flow is well known (col. 5, lines 3+), hence the nexus for controlling such a valve based on load/fuel flow, etc. is well established.

Allowable Subject Matter

13. Claim 26 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Amendment

14. Applicant's proposed drawing correction filed 2/18/04 are approved. Replacement formal sheets are required.

Response to Arguments

15. Applicant's arguments filed 2/18/04 have been fully considered and amend around the 102 rejections but they are not persuasive with respect to the use of the air valve and fuel valve to control the fuel/air ratio entering the premixer as being unobvious over the

prior art, as they are admitted prior art. Furthermore, these features are fairly taught by Ohyama et al and Komatsu et al – who fairly teach using valves for controlling the fuel and air valves entering the premixer by controlling valves (see e.g. abstract) for the fuel and air. Hence the mere use of valves for controlling the air and fuel flow is so notoriously old and well known in the art that their usage is clearly obvious.

16. Applicant's arguments with respect to claim 11 and 12 and not persuasive. First the amendment to claim 11 does indeed change the scope of the claim as there is no longer a mixture valve claimed. Hence, claim 11 (and thus claim 12) is broader than originally examined. Furthermore, the examiner disagrees with applicant's arguments concerning Ohyama as one of ordinary skill in the art would clearly be taught to use valves to control the flow of fuel and air to the premixer. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). As for applicant's arguments concerning claim 12, the controller for controlling the valves and mixture member are both individually known and their use together is altogether within the ordinary skill in the art.

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

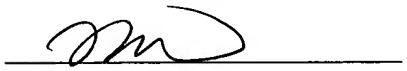
Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 703-308-2631. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax numbers for the organization where this application is assigned are 703-872-9306 for Regular faxes and 703-872-9306 for After Final faxes.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Justine Yu, can be reached on 703-308-2675.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of Technology Center 3700, whose telephone number is 703-308-0861.

General inquiries can also be directed to Technology Center Customer Service Office at 703-306-5648 or the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at http://www.uspto.gov/main/patents.htm



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